

AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (Currently Amended) An ink jet printing apparatus including a printhead arrangement for printing an image on a substrate in a pass of the substrate past the printhead arrangement in a printing direction, the printer comprising:

a printhead arrangement including a plurality of ink jet printheads for emitting droplets towards a surface of the substrate to form the image, wherein the printhead arrangement extends across substantially the full width of the substrate in a direction perpendicular to the printing direction ;

a plurality of rollers arranged to move the substrate past the printheads during the emission of the droplets from the printheads to print the image;

~~the apparatus further including a pressure source wherein the pressure source is arranged to apply a negative gauge pressure to the substrate to hold the substrate to the rollers in the region of the printhead arrangement;[[,]]~~

a mask element arranged between first and second rollers of the plurality of rollers such that a first gap is defined between the mask element and the first roller as well as a second gap between the mask element and the second roller, wherein the mask element throttles airflow caused by the negative gauge pressure through the first and second gaps;

wherein the apparatus is adapted to hold the printheads substantially stationary while the image is printed in a pass of the substrate past the printhead arrangement.

2. (Original) Apparatus according to claim 1, wherein the apparatus is adapted to print onto the surfaces of a plurality of discrete substrates.

3. (Previously Presented) Apparatus according to claim 1, wherein the apparatus includes at least three rollers arranged to move the substrate relative to the printheads.

4. (Previously Presented) Apparatus according to claim 1, wherein a roller is mounted substantially parallel to an adjacent roller such that the angle of the adjacent rollers is not more than 6 milliradians from parallel.

5. (Canceled).

6. (Previously Presented) Apparatus according to claim 1, where the negative gauge pressure is applied to the substrate in a region between adjacent rollers.

7. (Currently Amended) Apparatus according to claim 1, ~~further including an element arranged between the rollers adjacent the substrate wherein the mask element~~ is non-porous and has a T-shaped profile including a top flat surface and a depending portion, the top flat surface providing a guiding surface for the substrate moved by the plurality of rollers, the top flat surface being below and parallel to a plane defined by

tops of the first and second rollers, and the depending portion of the mask element extending between the first and second rollers.

8. (Original) Apparatus according to claim 7, wherein the element is arranged to restrict the airflow between the rollers.

9. (Previously Presented) Apparatus according to claim 7, wherein the element is arranged to reduce deformation of the substrate between the rollers.

10. (Previously Presented) Apparatus according to claim 1, further including a guide for guiding a leading edge of the substrate.

11. (Previously Presented) Apparatus according to claim 1, wherein the substrate comprises a substantially rigid material.

12. (Previously Presented) Apparatus according to claim 1, wherein the arrangement is such that the substrate is mounted, during printing, on a deformable surface.

13. (Previously Presented) Apparatus according to claim 1, wherein the apparatus is adapted to move the substrate at a speed greater than 1m/s.

14. (Previously Presented) Apparatus according to claim 1, wherein the

system is adapted to print a colour image.

15. (Previously Presented) Apparatus according to claim 1, wherein the apparatus is adapted to print an image having a resolution of greater than 120 dpi.

16. (Canceled).

17. (Currently Amended) A method of printing a substrate in an ink jet printer comprising a printhead arrangement, a plurality of rollers and a pressure source, the method comprising the steps of:

moving the substrate on the rollers past the printheads in a printing direction, of printheads that extend at least the full width of the image to be printed in a direction perpendicular to the printing direction;

applying a negative gauge pressure to the substrate to hold the substrate to the rollers in the region of the printhead arrangement^{[[,]]} and primarily throttling airflow caused by the negative gauge pressure through first and second gaps defined by first and second rollers of the plurality of rollers and a mask element arranged therebetween, wherein the first gap is positioned between the mask element and the first roller as well as the second gap is positioned between the mask element and the second roller,

emitting droplets from the printheads towards the substrate during the movement of the substrate past the printhead arrangement such that the image is printed onto the substrate in one pass of the substrate past the printhead arrangement; and

holding the printheads substantially stationary during the printing of the image on the substrate.

18-20. (Canceled).

21. (Previously Presented) Apparatus according to claim 7, wherein the element is arranged to be spaced apart from the substrate.

22. (Currently Amended) An ink jet printing apparatus including a printhead arrangement for printing an image on a substrate in a pass of the substrate past the printhead arrangement in a printing direction, the printer comprising:

a printhead arrangement including a plurality of ink jet printheads for emitting droplets towards a surface of the substrate to form the image, wherein the printhead arrangement extends across substantially the full width of the substrate in a direction perpendicular to the printing direction wherein the apparatus is adapted to hold the printheads substantially stationary while droplets are emitted from the printheads;

a plurality of rollers arranged to move the substrate past the printheads during the emission of the droplets from the printheads to print the image;

the apparatus further including a pressure source,

wherein the pressure source is arranged to apply a negative gauge pressure to the substrate to hold the substrate to the rollers in the region of the printhead arrangement,

wherein the apparatus is adapted to hold the printheads substantially stationary while the image is printed in a pass of the substrate past the printhead arrangement;

an element arranged between the rollers adjacent the substrate, Apparatus according to claim 7, wherein the element is substantially non-porous.

23. (Previously Presented) Apparatus according to claim 1, wherein the rollers are substantially non-porous.

24. (Previously Presented) Apparatus according to claim 1, wherein the arrangement is such that no roller is arranged so as to contact the surface of the substrate to be printed.

25. (Previously Presented) Apparatus according to claim 1, wherein the printheads are arranged directly adjacent to a roller for emitting ink onto a region of the substrate in contact with the roller.

26. (Currently Amended) An ink jet printing apparatus comprising:

a printhead arrangement for printing an image on a substrate, wherein the printhead arrangement includes a plurality of ink jet printheads for emitting droplets towards a surface of the substrate to form the image, wherein the apparatus is adapted to hold the printheads substantially stationary while ink is emitted towards the substrate and the substrate is moved past the printheads;

a transport device for moving the substrate through an ink jet printer, the device comprising a plurality of substrate support elements for supporting the substrate in the printer, the support elements including

a plurality of rollers arranged to move the substrate past the printheads during emission of droplets on the substrate, wherein the support elements of the transport device are all substantially aligned so that the path of the substrate through the printer is substantially planar,

the transport device further including a pressure source wherein the pressure source is arranged to apply a negative gauge pressure to the substrate to hold the substrate to the rollers in the region of the printheads;[[.]]

a mask element arranged between first and second rollers of the plurality of rollers such that a first gap is positioned between the mask element and the first roller as well as a second gap is positioned between the mask element and the second roller, wherein the mask element throttles airflow caused by the negative gauge pressure through the first and second gaps.

27. (Previously Presented) A method of printing onto a substantially rigid substrate using an ink jet printing apparatus including a printhead arrangement for printing an image on the substrate, and a transport device including a plurality of rollers and a pressure source, the method including:

moving the substrate into the printer and onto the rollers;

moving the substrate on the rollers past the printhead arrangement during printing;

applying a negative gauge pressure to the substrate to hold the substrate to the rollers in the region of the printhead arrangement and throttling airflow caused by the negative gauge pressure through first and second gaps defined by first and second rollers of the plurality of rollers and a mask element arranged therebetween, wherein the first gap is positioned between the mask element and the first roller as well as the second gap is positioned between the mask element and the second roller; and

emitting droplets from printheads of the printhead arrangement to deposit the droplets on the substrate, the printheads being held substantially stationary while ink is emitted towards the substrate and the substrate is moved past the printheads,

wherein the path of the substrate through the printer is substantially planar.